WHAT IS CLAIMED IS:

1. A direct type liquid fuel cell power generator, comprising:

an electromotive portion unit group composed of a plurality of electromotive portion units formed by sandwiching an electrolyte film between an anode electrode including an anode catalyst layer and a cathode electrode including a cathode catalyst layer;

a first flow path plate having formed thereon a first flow path which is disposed in abutment with the anode electrode of the electrode portion unit group and through which a fuel flows; and

a second flow path plate having formed thereon a second flow path which is disposed in abutment with the cathode electrode of the electrode portion unit group and through which an oxidizing agent flows;

wherein the first flow path passes so as to come into contact with all anode electrodes of the electromotive portion unit group without branching from an inlet thereof to an outlet, and is formed so as to come into contact with an anode electrode of at least one electromotive portion unit a plurality of times.

2. A direct type liquid fuel cell power generator according to claim 1, wherein, when "n" denotes the number of electromotive portion units which the electromotive portion unit group has; "s" denotes the number of passages of the first flow path through each

electromotive portion unit; "h" denotes the number of flow path regions and a product of "n" and "s"; $b_{r,m}$ ($1 \leq m \leq n$, $1 \leq r \leq s$) denotes a number assigned to the flow path region and a natural number equal to or smaller than "h"; $Zb_{r,m}$ denotes a distance from a flow path supply port of each flow path region; and L_0 denotes an effective length of the first flow path,

$$0 \leq \left| \frac{L_0(h+2)}{2h} - \frac{1}{s} \sum_{i=1}^{s} Z_{b_{i,m}} \right| \leq \frac{1}{20} \frac{L_0(h+2)}{2h} \quad (1)$$

$$b_{r,m} = m + n(r-1) - (2m - n + 1) \frac{1 - (-1)^{r-1}}{2} \quad (2)$$

is met.

3. A direct type liquid fuel cell power generator comprising:

an electromotive portion unit group composed of a plurality of electromotive portion units formed by sandwiching an electrolyte film between an anode electrode including an anode catalyst layer and a cathode electrode including a cathode catalyst layer;

a first flow path plate having formed thereon a first flow path which is disposed in abutment with the cathode electrode of the electrode portion unit group and through which an oxidizing agent flows; and

a second flow path plate having formed thereon a second flow path which is disposed in abutment with the anode electrode of the electrode portion unit group and through which a fuel flows;

wherein the first flow path passes so as to come into contact with all cathode electrodes of the electromotive portion unit group without branching from an inlet thereof to an outlet, and is formed so as to come into contact with a cathode electrode of at least one electromotive portion unit a plurality of times.

4. A direct type liquid fuel cell power generator according to claim 3, wherein, when "n" denotes the number of electromotive portion units which the electromotive portion unit group has; "s" denotes the number of passages of the first flow path through each electromotive portion unit; "h" denotes the number of flow path regions and a product of "n" and "s"; $b_{r,m}$ ($1 \leq m \leq n$, $1 \leq r \leq s$) denotes a number assigned to the flow path region and a natural number equal to or smaller than "h"; $Zb_{r,m}$ denotes a distance from a flow path supply port of each flow path region; and L_0 denotes an effective length of the first flow path,

$$0 \leq \left| \frac{L_0(h+2)}{2h} - \frac{1}{s} \sum_{i=1}^{s} Z_{bi,m} \right| \leq \frac{1}{20} \frac{L_0(h+2)}{2h} \quad (1)$$

$$b_{r,m} = m + n(r-1) - (2m-n+1) \frac{1-(-1)^{r-1}}{2} \quad (2)$$

is met.

5. A direct type liquid fuel cell power generator comprising:

first and second electromotive portion unit groups each formed by sandwiching an electrolyte film between

an anode electrode including an anode catalyst layer and a cathode electrode including a cathode catalyst layer;

a first flow path plate having formed thereon a first flow path which is disposed in abutment with the anode electrode of the first electromotive portion unit group and through which a fuel flows;

a second flow path plate having formed thereon a second flow path which is disposed in abutment with the cathode electrode of the first electromotive portion unit group and through which an oxidizing agent flows on one face side and having formed thereon a third flow path which is disposed in abutment with the anode electrode of the second electromotive portion unit group and through which an fuel flows on the other face side;

a third flow path plate having formed thereon a fourth flow path which is disposed in abutment with the cathode electrode of the second electromotive portion unit group and through which a oxidizing agent flows; and

an external electrode provided for external connection,

wherein the first to third flow paths are composed of an insulating member, and a conductive portion which is conductive between the anode electrode and the cathode electrode of the first and second electromotive

portion unit groups or which is conductive to the external electrode is formed on the first to third flow path plates each.

6. A direct type liquid fuel cell power generator according to claim 2, wherein, on the second flow path plate, the flow path is formed in a bent or meandered shape in a planar direction of the flow path plate, and penetrates in a thickness direction of the second flow path plate, and one flow path is formed of the second flow path and the third flow path.

7. A direct type liquid fuel cell power generator according to claim 6, wherein the second flow path plate have a reinforce member to hold a sectional shape of each flow path formed therein.

8. A direct type liquid fuel cell power generator according to claim 7, wherein the reinforce member has a sectional area which is equal to or smaller than 50% of a sectional area of the flow path and a thickness of 0.2 mm or more.

9. A direct type liquid fuel cell power generator according to claim 7, wherein the reinforce member forms a part of the conductive portion.

10. A direct type liquid fuel cell power generator according to claim 8, wherein the reinforce member forms a part of the conductive portion.

11. A direct type liquid fuel cell power generator according to claim 5, wherein the flow path plate has

a penetrating portion formed in a tunnel shape between portions being into contact with the anode electrode or the cathode electrode of the flow path, and an outlet or an inlet of the penetrating portion is disposed in the range between 0.5 mm and 1.0 mm in the inward direction of the anode electrode or cathode electrode from an end of the anode electrode or the cathode electrode.

12. A direct type liquid fuel cell power generator according to claim 5, wherein the flow path plate has a penetrating portion formed in a tunnel shape between a portion being into contact with the anode electrode or the cathode electrode of the flow path and a supply port or an ejection port of the flow path, and an outlet or an inlet of the penetrating portion is disposed within the range between 0.5 mm and 1.0 mm in the inward direction of the anode electrode or cathode electrode from an end of the anode electrode or the cathode electrode.

13. A direct type liquid fuel cell power generator according to claim 5, wherein the flow path plate is formed by pasting a plurality of insulating resin members with each another.

14. A direct type liquid fuel cell power generator according to claim 5, wherein the insulating member is formed by any one of polyether imide resin, polyimide resin, polyamide imide resin, polysulfone resin,

polyether sulfone resin, melamine phenol resin, silicon resin, polycarbonate resin, heat resistance vinyl ester resin, bis-phenol F-type epoxy resin, phenol novolak type epoxy resin, phenol resin, diaryl phthalate resin, polyamide resin, and polybutylene terephthalate or a combination of a plurality of different resin members.

15. A direct type liquid fuel cell power generator according to claim 5, wherein a space for temporarily reserving the fuel or the oxidizing agent is integrally formed on the flow path plate.

16. A direct type liquid fuel cell power generator comprising:

first and second electromotive portion unit groups each formed by sandwiching an electrolyte film between an anode electrode including an anode catalyst layer and a cathode electrode including a cathode catalyst layer;

a first flow path plate having formed thereon a first flow path which is disposed in abutment with the cathode electrode of the first electromotive portion unit group and through which an oxidizing agent flows;

a second flow path plate having formed thereon a second flow path which is disposed in abutment with the anode electrode of the electromotive portion unit group and through which a fuel flows on one face side, and having formed thereon a third flow path which is disposed in abutment with the cathode electrode of the

second electromotive unit group and through which a oxidizing agent flows on the other face side;

a third flow path plate having formed thereon a fourth flow path which is disposed in abutment with the anode electrode of the second electromotive portion unit group and through which an fuel flows; and

an external electrode provided for external connection,

wherein the first to third flow path plates are composed of an insulating member, and a conductive portion which is conductive between the anode electrode and the cathode electrode of the first and second electromotive portion unit groups or which is conductive to the external electrode is formed on the first to third flow path plates each.

17. A direct type liquid fuel cell power generator according to claim 4, wherein, on the second flow path plate, the flow path is formed in a bent or meandered shape in a planar direction of the flow path plate, and penetrates in a thickness direction of the second flow path plate, and one flow path is formed of the second flow path and the third flow path.

18. A direct type liquid fuel cell power generator according to claim 17, wherein the second flow path plate have a reinforce member to hold a sectional shape of each flow path formed therein.

19. A direct type liquid fuel cell power generator

according to claim 18, wherein the reinforce member has a sectional area which is equal to or smaller than 50% of a sectional area of the flow path and a thickness of 0.2 mm or more.

20. A direct type liquid fuel cell power generator according to claim 18, wherein the reinforce member forms a part of the conductive portion.

21. A direct type liquid fuel cell power generator according to claim 19, wherein the reinforce member forms a part of the conductive portion.

22. A direct type liquid fuel cell power generator according to claim 16, wherein the flow path plate has a penetrating portion formed in a tunnel shape between portions being into contact with the anode electrode or the cathode electrode of the flow path, and an outlet or an inlet of the penetrating portion is disposed in the range between 0.5 mm and 1.0 mm in the inward direction of the anode electrode or cathode electrode from an end of the anode electrode or the cathode electrode.

23. A direct type liquid fuel cell power generator according to claim 16, wherein the flow path plate has a penetrating portion formed in a tunnel shape between a portion being into contact with the anode electrode or the cathode electrode of the flow path and a supply port or an ejection port of the flow path, and an outlet or an inlet of the penetrating portion is

disposed within the range between 0.5 mm and 1.0 mm in the inward direction of the anode electrode or cathode electrode from an end of the anode electrode or the cathode electrode.

24. A direct type liquid fuel cell power generator according to claim 16, wherein the flow path plate is formed by pasting a plurality of insulating resin members with each another.

25. A direct type liquid fuel cell power generator according to claim 16, wherein the insulating member is formed by any one of polyether imide resin, polyimide resin, polyamide imide resin, polysulfone resin, polyether sulfone resin, melamine phenol resin, silicon resin, polycarbonate resin, heat resistance vinyl ester resin, bis-phenol F-type epoxy resin, phenol novolak type epoxy resin, phenol resin, diaryl phthalate resin, polyamide resin, and polybutylene terephthalate or a combination of a plurality of different resin members.

26. A direct type liquid fuel cell power generator according to claim 17, wherein a space for temporarily reserving the fuel or the oxidizing agent is integrally formed on the flow path plate.

27. A direct type liquid fuel cell power generator comprising:

an anode electrode including an anode catalyst layer;

a cathode electrode including a cathode catalyst

layer;

a fuel container comprising at least two electromotive portion units, each of which comprises an electrolyte film disposed between the anode electrode and the cathode electrode, the fuel container housing a fuel therein; and

a flow path plate having formed thereon a flow path to supply an oxidizing agent or a fuel to the electromotive portion unit,

wherein the flow path has a flow path which produces flow-back again from the fuel container to the first electromotive portion unit via the first electromotive portion unit and the second electromotive portion unit, and which is not branched during the flow-back.

28. A direct type liquid fuel cell power generator according to claim 1 comprising: meeting the following condition:

$$Y \leq Y_0 \times 2 \quad \ldots (101)$$

$$Y_0 = 1.04 \times 10^{-4} \times nI/C_{MeOH} \quad \ldots (102)$$

$$1.0 \leq C_{MeOH} \leq 5.0 \quad \ldots (103)$$

wherein "n" denotes the number of electromotive portion units which the electromotive portion unit group has; I denotes a current outputted by each electromotive portion unit; C_{MeOH} denotes a concentration of a methanol aqueous solution fuel to be supplied; Y denotes a total amount (l/min) of the methanol aqueous

solution fuel supplied to the electromotive portion unit group; and a temperature of the each electromotive portion unit is within the range from 40°C to 70°C.

29. A direct type liquid fuel cell power generator according to claim 3 comprising: meeting the following condition:

$$Y \leq Y_0 \times 2 \quad \ldots (101)$$

$$Y_0 = 1.04 \times 10^{-4} \times nI/C_{MeOH} \quad \ldots (102)$$

$$1.0 \leq C_{MeOH} \leq 5.0 \quad \ldots (103)$$

wherein "n" denotes the number of electromotive portion units which the electromotive portion unit group has; I denotes a current outputted by each electromotive portion unit; C_{MeOH} denotes a concentration of a methanol aqueous solution fuel to be supplied; Y denotes a total amount (l/min) of the methanol aqueous solution fuel supplied to the electromotive portion unit group; and a temperature of the each electromotive portion unit is within the range from 40°C to 70°C.

30. A direct type liquid fuel cell power generator according to claim 5 comprising: meeting the following condition:

$$Y \leq Y_0 \times 2 \quad \ldots (101)$$

$$Y_0 = 1.04 \times 10^{-4} \times nI/C_{MeOH} \quad \ldots (102)$$

$$1.0 \leq C_{MeOH} \leq 5.0 \quad \ldots (103)$$

wherein "n" denotes the number of electromotive portion units which the electromotive portion unit group has; I denotes a current outputted by each electromotive

portion unit; C_{MeOH} denotes a concentration of a methanol aqueous solution fuel to be supplied; Y denotes a total amount (l/min) of the methanol aqueous solution fuel supplied to the electromotive portion unit group; and a temperature of the each electromotive portion unit is within the range from 40°C to 70°C.

31. A direct type liquid fuel cell power generator according to claim 16 comprising: meeting the following condition:

$$Y \leq Y_0 \times 2 \quad \ldots (101)$$

$$Y_0 = 1.04 \times 10^{-4} \times nI/C_{MeOH} \quad \ldots (102)$$

$$1.0 \leq C_{MeOH} \leq 5.0 \quad \ldots (103)$$

wherein "n" denotes the number of electromotive portion units which the electromotive portion unit group has; I denotes a current outputted by each electromotive portion unit; C_{MeOH} denotes a concentration of a methanol aqueous solution fuel to be supplied; Y denotes a total amount (l/min) of the methanol aqueous solution fuel supplied to the electromotive portion unit group; and a temperature of the each electromotive portion unit is within the range from 40°C to 70°C.

32. A direct type liquid fuel cell power generator according to claim 1, comprising:

a liquid fuel supply device which supplies a liquid fuel to the flow path plate which comes into

contact with an anode electrode of the electromotive portion unit group;

an oxidizing agent supply device which supplies an oxidizing agent to the flow path plate which comes into contact with a cathode electrode of the electromotive portion unit group;

a liquid fuel container which houses a liquid fuel and supplies the liquid fuel to the liquid fuel supply device;

a gas-liquid separating mechanism which separates only a gas component from a discharged matter of the anode electrode; and

an electric circuit which supplies a part of a voltage output obtained from the electromotive portion unit group to the liquid fuel supply device and the oxidizing agent supply device and supplies at least a part of the remaining power output to external electric equipment.

33. A direct type liquid fuel cell power generator according to claim 3, comprising:

a liquid fuel supply device which supplies a liquid fuel to the flow path plate which comes into contact with an anode electrode of the electromotive portion unit group;

an oxidizing agent supply device which supplies an oxidizing agent to the flow path plate which comes into contact with a cathode electrode of the electromotive

portion unit group;

a liquid fuel container which houses a liquid fuel and supplies the liquid fuel to the liquid fuel supply device;

a gas-liquid separating mechanism which separates only a gas component from a discharged matter of the anode electrode; and

an electric circuit which supplies a part of a voltage output obtained from the electromotive portion unit group to the liquid fuel supply device and the oxidizing agent supply device and supplies at least a part of the remaining power output to external electric equipment.

34. A direct type liquid fuel cell power generator according to claim 5, comprising:

a liquid fuel supply device which supplies a liquid fuel to the flow path plate which comes into contact with an anode electrode of the electromotive portion unit group;

an oxidizing agent supply device which supplies an oxidizing agent to the flow path plate which comes into contact with a cathode electrode of the electromotive portion unit group;

a liquid fuel container which houses a liquid fuel and supplies the liquid fuel to the liquid fuel supply device;

a gas-liquid separating mechanism which separates

only a gas component from a discharged matter of the anode electrode; and

an electric circuit which supplies a part of a voltage output obtained from the electromotive portion unit group to the liquid fuel supply device and the oxidizing agent supply device and supplies at least a part of the remaining power output to external electric equipment.

35. A direct type liquid fuel cell power generator according to claim 16, comprising:

a liquid fuel supply device which supplies a liquid fuel to the flow path plate which comes into contact with an anode electrode of the electromotive portion unit group;

an oxidizing agent supply device which supplies an oxidizing agent to the flow path plate which comes into contact with a cathode electrode of the electromotive portion unit group;

a liquid fuel container which houses a liquid fuel and supplies the liquid fuel to the liquid fuel supply device;

a gas-liquid separating mechanism which separates only a gas component from a discharged matter of the anode electrode; and

an electric circuit which supplies a part of a voltage output obtained from the electromotive portion unit group to the liquid fuel supply device and the

oxidizing agent supply device and supplies at least a part of the remaining power output to external electric equipment.